REMARKS/ARGUMENTS

The claims are 2, 6, 9-15 and 17-23. Claims 3, 4 and 8 have been canceled in favor of new claims 17, 18 and 19 respectively. Accordingly, claim 16 (on which claims 3 and 8 previously depended) has been canceled. Claims 2, 6, 10, 13 and 15 have been amended to depend on new claim 17, claim 9 has been amended to depend on new claim 19, and claim 14 has been amended to depend on claim 13. These claims have also been amended to improve their form. In addition, new claim 20 has been added directed to automatic adjustment of only the delay time of the delay elements, new claim 21 has been added directed to subject matter previously appearing in claim 11, new claim 22 has been added directed to the subject matter of claim 13 but dependent on claim 18, new claim 23 has been added directed to the subject matter of claim 14 but dependent on claim 22, and claim 2 has been amended to recite an arrangement on a straight line. Support for the claims may be found, *inter alia*, in the disclosure, in the first full paragraph of page 5, the first full paragraph on page 6, the paragraph bridging pages 10-11 and Figure 3. Reconsideration is expressly requested.

The Examiner indicated that claim 9 contains allowable subject matter; however, the remaining claims were rejected on the basis of the prior art. Specifically, claims 2, 6, 7, 15 and 16 were rejected under 35 U.S.C. §102(e) as being anticipated by *Ohkubo et al. U.S. Patent No. 5,862,240.* Claims 3, 4, 8, 10, 11 and 12 were rejected under 35 U.S.C. §103(a) as being unpatentable over *Ohkubo et al.* Claims 13 and 14 were rejected under 35 U.S.C. §103(a) as being unpatentable over *Ohkubo et al.* in view of *Sibbald et al. U.S. Patent No. 5,600,727.*

Essentially, the Examiner repeated his previous position that *Ohkubo et al.* discloses a sound recording device as recited in the rejected claims except for features which are considered within the skill of the art or shown by *Sibbald et al.* The Examiner also indicated that Figure 10 of *Ohkubo et al.* shows microphones 41, 42 and 43 directed towards sound source S and that Figure 1 of *Okhubo et al.* shows a microphone device with an addition circuit, and that Figure 10 discloses an alternative embodiment with the microphones arranged on a circumference.

This rejection is respectfully traversed.

As set forth in new claims 17 and 19, Applicant's invention provides a sound pickup device for a public address system including at least two acoustic sensors for picking up sound emitted from a sound source and converting into electric signals, and a common signal amplitude add device electrically or acoustically connected to the acoustic sensors. The acoustic sensors are spaced from a useful zone from which useful signals eminate, and have directional characteristics and are oriented so that the axes of their main reception directions are directed towards a reference position within the useful zone. The reference position corresponds to an ideal set position of the sound source, and directional vectors between the reference position and the acoustic sensors point in different directions.

As recited in new claim 17, the sound pickup device includes delay elements associated with individual ones or all of the acoustic sensors, and the acoustic sensors are arranged with different spacing to the reference position.

As recited in new claim 19, the sound pickup device includes an optical marking for indicating the ideal set position of the sound source.

As more specifically recited in dependent claim 10, the arrangement of the acoustic sensors and/or their main reception directions and/or the delay time of the delay elements is automatically adjusted to a modification of the actual position of the sound source so that the reference position of the sound pickup device follows the actual position of the sound source. As more specifically recited in new claim 20, only the delay elements are automatically adjusted. In this case, only the correction of time-of-flight is carried out, which is sufficient in most applications. This feature makes sure that phasing effects are avoided, which otherwise would negatively affect the frequency response when the speaker moves slightly out of the reference portion. Automatically adjusting the delay elements is more important than automatically adjusting the main axis of the receivers because the polar pattern of the receivers allows some deviation of the second source without significant loss of volume.

As more specifically recited in dependent claims 13 and 22, the activity and/or position of the sound source is determined by a correlator to which are supplied the signals of the acoustic sensors or the position of the sound source is determined by

measuring the time difference of zero crossings of the signals of different acoustic sensors.

As more specifically recited in dependent claim 14, the electric signals of the acoustic-electric transducers, following digitization, are supplied to a digital signal processor, which simulates an adder, a delay element, and/or a correlator.

As more specifically recited in dependent claim 23, the electric signals of the acoustic-electric transducers, following digitization, are supplied to a digital signal processor, which simulates an adder, a delay element, an additional transmission element and/or a correlator.

With Applicant's sound pickup device, the transmission quality, particularly the frequency response, remains constant even in cases of movements of the speaker, because of the automatic adaptation of the running time elements to the current position of the sound source. This feature is a great technical advance, because otherwise, there is already significant frequency response deterioration even in the case of slight movements.

None of the cited references disclose or suggest a sound pickup device for a public address system, having the structure set forth in Applicant's claims 17 and 19, or achieves the benefits resulting from that structure. Although the Examiner has taken the position that Figure 10 of the primary reference *Ohkubo et al.* shows microphones 41, 42 and 43 directed towards sound source S, it is respectfully submitted that the Examiner's interpretation is based on speculation, rather than anything disclosed in *Okhubo et al.* Not only does *Ohkubo et al.* fail to disclose or suggest in Figure 10 the microphones' main directivities pointing to the reference point, *Ohkubo et al.* fails to disclose or suggest adding an addition circuit to Figure 10. Moreover, *Ohkubo et al.* fails to disclose or suggest microphones directed to a single reference point which are not equidistant to the reference point (e.g. in-line as more specifically recited in claim 2).

In any event, there is no disclosure or suggestion in *Ohkubo et al.* of a sound pickup device in which delay elements associated with individual ones or all the acoustic sensors are provided and the acoustic sensors are arranged with differing spacing to the reference position as recited in claim 17. Although the Examiner concedes that *Ohkubo et al.* does not show

the varying differences, he has nonetheless taken the position that it would have been obvious to one of ordinary skill in the art that a time delay would exist in the arrangement of Figure 10 and that it would have been obvious to provide transmission dimensions that have different passage paths. It is respectfully submitted, however, that there is nothing in *Ohkubo et al.* to provide the features recited in claim 17.

Similarly, there is nothing in *Ohkubo et al.* that discloses or suggests an optical marking for indicating the ideal set position of the sound sources recited in claim 19.

Morever, there is nothing in *Ohkubo et al.* that discloses or suggests a sound pickup device as recited in dependent claim 10, wherein the arrangement of the acoustic sensors and/or their main reception directions and/or the time delay of the delay elements is automatically adjusted to a modification of the actual position of the sound source so that the reference position of the sound pickup device follows the actual position of the sound source. Although the Examiner has taken the position that it would have been obvious to one of ordinary skill in the art to manually move the microphone arrangement as a whole to follow a moving sound source, there is no disclosure or suggestion of

adjusting the arrangement automatically as recited in dependent claim 10.

Similarly, there is nothing in *Ohkubo et al.* that discloses or suggests determining the activity and/or position of a sound source by a correlator to which are supplied the signals of the acoustic sensors or determining the position of the sound source by measuring the time difference of zero crossings of the signals of different acoustic sensors as recited in dependent claims 13 and 22. There is also nothing in *Ohkubo et al.* that discloses or suggests the arrangement of sound pickup devices recited in dependent claim 14, wherein the electric signals of the acoustic-electric transducers, following digitization, are supplied to a digital signal processor, which simulates an adder, a delay element, and/or a correlator.

Moreover, there is nothing in *Ohkubo et al.* that discloses or suggests the arrangement of sound pickup devices recited in dependent claim 23, wherein the electric signals of the acoustic-electric transducers, following digitization, are supplied to a digital signal processor, which simulates an adder, a delay element, a transmission element and/or a correlator.

Although the Examiner has taken the position that the secondary reference to *Sibbald et al.* shows these features, it is respectfully submitted that there is no disclosure or suggestion in *Sibbald et al.* of position determination in the manner set forth in Applicant's claims. Rather, *Sibbald et al.* undertakes a position determination in a completely different manner using loud speaker signals for identifying a reference position. In contrast, in Applicant's claimed system, loud speaker signals are not used at all.

It is respectfully submitted that contrary to the Examiner's position, *Sibbald et al.* fails to show "deriving the position of the sound source in relation to the microphones..." *Sibbald et al.* determines the position of a plurality of microphones relative to a given reference point (which is not a sound source) by "transmitting... sonic signals from each of a plurality of sonic signal generators situated at known positions..." See, e.g., claim 1 of *Sibbald et al.* In contrast, Applicant's invention as recited in dependent claims 13-14 and 22-23 does not require additional signal generators and does not determine the positions of a plurality of (occasionally individually moving) microphones with respect to a known reference position. In contrast to *Sibbald et al.*, Applicant's microphones are always at

known positions, and Applicant's device determines the actual (constantly moving) position of a sound source with respect to the positions of the microphones. Contrary to the Examiner's position, this process is not *Sibbald et al.'s* position determination in the other direction; it is a completely different process. Applicant's device uses the sound of the moving sound source itself for the calculation of its own position without introducing signal generators.

Automatic positioning systems all around the world use time-of flight data for calculations. This use is all the same in radar and in submarines and in many other applications, which is the only similarity to *Sibbald et al.* and is common with many others. The question is, which is the test signal, is it an extra one to be emitted via transmitters, or is it just the signal emitted from the sound source to be recorded. In contrast to the prior art, Applicant has applied the known time-of-flight method to a multi-receiver sound pickup device in order to derive the actual position of the speaker and to automatically adjust the time delay elements for best frequency response and/or to make the directivity follow the actual speaker position. This approach is nowhere disclosed or suggested by the cited references and does not result from the ordinary work of a person

skilled in the art. Indeed, Applicant does not really need to know the actual position of the sound source when automatically adjusting the time delay elements without adjusting the directivity. It would be sufficient in this case just to compensate the time-of-flight differences, which can be easily done by controlling each time element in a way that there is no difference left between the corrected microphone signals before they are added.

Moreover, with respect to dependent claim 14, although the Examiner takes the position that col 3, lines 10-22 of *Sibbald et al.* show a signal processor that inspects the signals of the microphones for the determination of the transmission time element (time delay), it is respectfully submitted that such reliance on *Sibbald et al.* is misplaced. *Sibbald et al.* does not introduce time delay elements (as Applicant does). Rather, *Sibbald et al.* simply calculates the microphone positions. In contrast, the main job of Applicant's signal processor is the realization of the time delay elements, where the signals are fed through, and adjusting them to the actual situation, which is not the case with *Sibbald et al.* That it is known that signal processors are capable of calculating, delaying and adding does

not disclose or suggest Applicant's invention as recited in claim 14.

Accordingly, it is respectfully submitted that Applicant's invention as recited in new claims 17 and 19 and the dependent claims, including dependent claim 9 which the Examiner has indicated contains allowable subject matter, are patentable over the cited references.

In summary, claims 2, 6 and 9-15 have been amended, claims 3, 4, 7, 8 and 16 have been canceled, and new claims 17-23 have been added. In view of the foregoing, withdrawal of the final action and allowance of this application are respectfully requested.

Respectfully submitted,
GERHARD KOCK (PCT)

COLLARD & ROE, P.C.
1077 Northern Boulevard
Roslyn, New York 11576
(516) 365-9802
FJD:lgh

Allison C. Collard, Reg.No.22,532
Edward R. Freedman, Reg.No.26,048
Frederick J. Dorchak, Reg.No.29,298
Attorneys for Applicant

I hereby certify that this correspondence is being deposited with the U.S. Postal Service as first class mail in an envelope addressed to: Commissioner of Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on September 6, 2005.

Maria Guastella